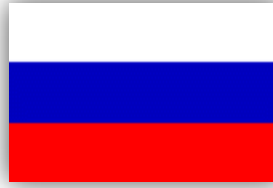


M42 & X06

Russian Diplomatic & Intelligence stations



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GENERAL

The Russians have quite a lot of stations that transmit coded messages on LF/MF/HF. Like all other numbers station it's hard, if not impossible, to find out if the transmissions are actually related to espionage activities. Some most probably are spy stations, some are definitely linked to governmental communications (embassy traffic etc.), but I guess that the majority of the stations are military stations, either GRU related or just plain military activity (tactical nets, naval stations, etc). Most of the military stations don't have a specific Enigma code but can be cataloged under former Enigma code M32. Let's start with the list of Enigma designators for these stations. Note that Enigma has deleted some of these designators, but for clarity we will still be using them in this document and in Numbers & Oddities logs.

1. Enigma codes for alleged spy stations: E06, E07, E17, E20, G06, G07, G17, G19, S06, S07, V06, V07, M12, M14, S25, XP, XPA, XPH, XPL, XPM (XP.. are polytone stations)
 2. Enigma codes for diplomatic stations: M42, X06. N&O also used M42a for the Israeli/Russia link.
 3. Enigma codes for military stations: M18, M21 (PVO), M32, M41 (PVO), MX (beacons and morse channel markers), S13, S14, S28 (Buzzer), S30 (Pip), S32 (Squeaky Wheel).
-

M42 / M42a

The RTTY/digital network has been monitored by a large number of dxers since the early 1980's and even before that time when they were using Morse only. When we first discovered the network we didn't know who they were, so we nicknamed them "the Brotherhood". A couple of years and a lot of work later we knew that this is in fact a Soviet, now Russian, governmental network. In the 1990's a new name was used by the dxers. According to several sources the main user of the net was SOUD, so this name replaced "the Brotherhood". Later FAPSI has been used.

Why FAPSI?

In 1995 by decree of President Boris Yeltsin all cryptographic systems except those licensed by FAPSI were forbidden in the Russian Federation. There are widespread rumors that all systems licensed by FAPSI have backdoors allowing the agency to freely access the encrypted information. Since 1998 they require that all Internet providers in Russia install their hardware named SORM (COPM — Система Оперативно-Розыскных Мероприятий, System of Operative Investigative Actions) that allows filtering and remote control of internet traffic from FAPSI headquarters. FAPSI is also responsible for maintaining both the governmental and presidential information systems and telecommunication lines. It controls Russia's physical communications systems, including government telephone lines, high-frequency communications, and cryptography services. FAPSI initially maintained communications lines for the Russian President and security services. Basically they were and still are responsible for the actual transmissions.

One of the other names that was used after FAPSI is DOSC, Department of State Communications, a name that is more appropriate than the ones used before that. To simplify it even more we now use "Russian Government/Intelligence" (Russian Gov/Intel) or "Russian Diplo" when the transmission is recognized as a diplomatic transmission (the use of links, mazielka, or CROWD-36).

The first encounters in the USA with the "Brotherhood" stations were in the late 1970's when they still used high speed CW (ca. 32 WPM). Most of the early CW stations (PSN, BPA, SPK, WNY, YBU) were still active in the late 1990's. "ROL" however disappeared completely. In the mid 1980's the RTTY transmissions started. The speed used was 50bd. Messages to YBU were the most common ones in those days. Also messages to PSN were monitored. The callup was slightly different from the system that is used nowadays:

VVV PSN PSN 2/245 VVV PSN PSN 2/245
NW NW
NR 271 GR 135
+ 5L or 5F groups

Then in the mid 1980's they changed to the 5 group preamble that they are still using today. But the original link designators were different back then.

The WFO/MIG link was the only known 2-way link in the Americas. The station sending WFO was definitely the Cuban end. The other end has been pin pointed in the New York City area, probably the Russian UN delegacy.

In the late 1980's the European network of RTTY stations popped up, similar to the network that was active in the America's. The master station in Europe was "RCF". Several frequency guides listed "RCF" as Ministry for Foreign Affairs in Moscow. After the disintegration of the USSR, the "RCF" callsign disappeared. The new master station was as powerful as "RCF" was and one thing is for sure: this station was located in or very near Moscow as well. The station was DFed many times

and every time Moscow appeared to be the source of the signal. Whether the master station or "RCF" really was MFA Moscow is not 100% sure but it definitely was a diplo station and the net a diplo network. Whenever something hot was happening in the 1990's, like the Chechenya actions, the stations in this net were making overtime, even on Sundays, while there were normally no transmissions on Sundays. The only station that was often heard on Sundays was "BFR", which may indicate that it was possibly located in an Islamic country.

The master station still transmits online and offline encrypted messages to the other stations. There are fixed schedules for a couple of stations while others are reported less frequently. During the time that "RCF" was still in place they used a traffic list system. In the 1990's the traffic list system was replaced and each link now had one or two fixed schedules on an assigned frequency pair. The auto-broadcasts to amongst others KUL, VKX, RAU and RKD were probably just circulars or routine traffic sent to the specific networks. They were transmitted blind and therefore repeated throughout the day on several frequencies. They also QSLed received messages.

RTTY was their major system. Later-on CROWD-36 became the most popular diplo mode. Nowadays both RTTY and CROWD-36 are still being used. The callups and messages can be divided into two groups: the most common one for the America's and Europe was: "4646464646464646 KUL KUL KUL KUL 1/226". Note that 46's are transmitted instead of RY's, then the callsign of the recipient and the number of messages/number of 5-letter or 5-figure groups in this message. The other one was only noted in Europe but might have been expanded to other areas by now. These transmissions start with a selcal of 6-tones (the selcal system is called Mazielka), followed by the callsign of the recipient sent in CW, then into RTTY where the preamble is handkeyed while the other system had an automated preamble.

The Mazielka callup has been reported since mid 1994. The Mazielka is a selcal system that was used by the master station to wake up a station outside the normal fixed sked. It was probably only used to catch the operators attention, not to start the equipment remotely. The fact that they switched to CW after the Mazielka was a sure sign that the operator had to prepare the equipment before they could start the transmission. The use of non-error correcting RTTY systems made it practically impossible to establish a link automatically. The Mazielka was never used during the normal schedule times. Nowadays the system seems to be more structured and even has several more or less fixed schedules. The Mazielka now probably automatically activates the receiving equipment because they seldom start the actual transmissions with CW these days. The CW operator chats after the messages are still there though, although not as often as before. X06 now also transmits test sequences (123456) and two or three tones sequences. They did not do that in the early days. It is unknown if the 2-tone and 3-tone calls are also tests or that they serve another purpose.

We have found several facts regarding the preambles of the link system that are valid today. Let's take a closer look at the preambles. Each message starts with a preamble that consists of 5 groups, followed by the message itself. A typical preamble looks like this: 11177 00142 23687 05012 01109.

- 1st group: The message identifier, stating what kind of message it is. This might also be a priority code. 11144, 11166, 11177 and 11199 are the combinations heard so far. The most common are 11177 and 11199. The latter is being used for QSL purposes.
- 2nd group: The link-identifier, each link has its own id, except for stations who have a two-way link, in that case both stations have the same link-id.
- 3rd group: Could be related to the key. Most of the time a 5-figure group but also "00000" was regularly noted.

- 4th group: The first two digits are the date and the last three are the message number.
- 5th group: The first four digits represent the number of groups in the message + 1. The extra group is most likely the key (3rd group of the preamble). The last digit is either a "1" or a "9".

After the messages have been sent, the operators sometimes have a little chat. In the America's the conversations were often in poor English while on the European side they often chatted in Cyrillic.

As I mentioned earlier, they also used QSL messages. The QSL messages were transmitted on other frequencies and even on other days than the day the original messages were sent. These QSL messages are no longer transmitted, as far as I know.

Note that the first group of the QSL preamble is always 11199 and the messages always started with 55555 followed by 77011, while the last groups represent the QSLed message number.

A typical QSL preamble and message looks like this:

11199 00142 00000 18010 00069
55555 77011 00089 00090 00091



KGB shield

Various RTTY speeds were used on this net in the 1990's. The most common were Baudot 50Bd, 75Bd and 100Bd with 500Hz shift. Besides RTTY also CROWD36 and Morse have been used. Today a host of digital modes are being used by the supposed Russian Governmental and Intelligence stations. The Diplomatic stations however seem to stick to RTTY (mainly 50 and 100Bd) and CROWD-36.

In the (recent) past many Direction Finding activities were conducted with good results. The European master station is located in the Moscow region, while the now defunct WFO/MIG link was the link between Cuba and the New York area, probably the Russian UN legation. Station GMN could have been located in or near Mexico City. Most transmissions came from either Moscow or Cuba. Only a few other locations are known. See further the callsign list at the end of this article.

Moscow sends messages to many other stations, most likely governmental stations like embassies and consulates. The transmissions from Cuba were to BAR, BPA, HZW, JMS, KAC, NDO, PSN, SPK, WFO, WNY, YBU; all unid locations except for WFO.

There is a very significant feature to the 5-letter traffic. The last group of every message is a simple substitution which indicates the date the message was composed and the group count which is always 3 less than the group count shown in the preamble.

The substitution is: O I U Z T R E W A P
0 1 2 3 4 5 6 7 8 9

For example:

11177 00148 57477 26811 00609

5LGs QKANG XOBJZ VEVXX UEORW

The last group translates to 26057 -- 26th of the month, 57 groups

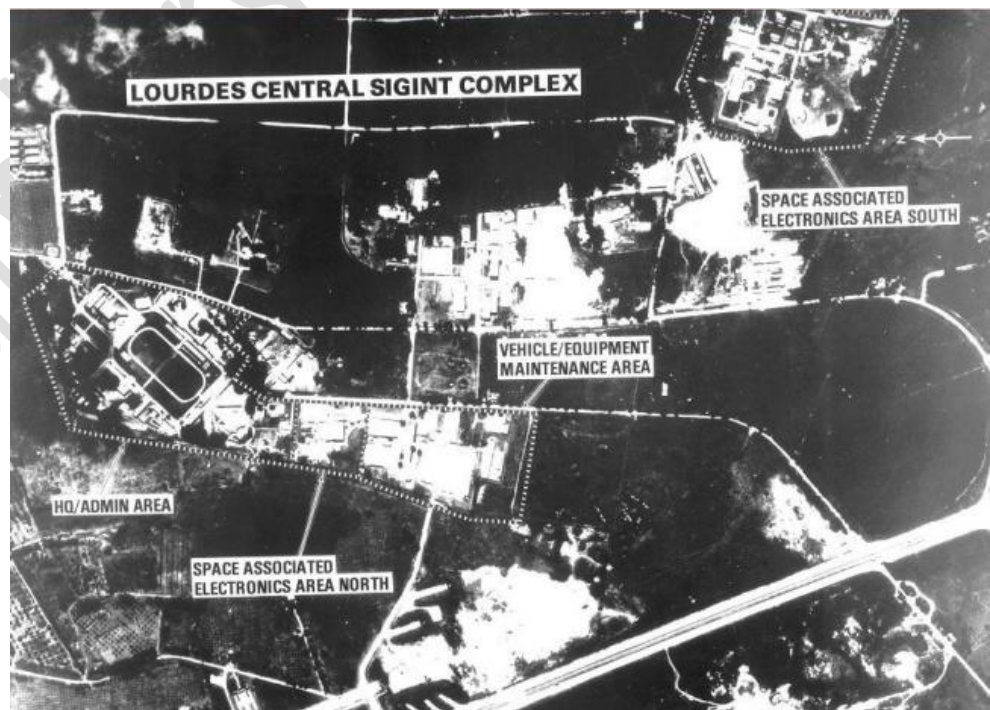
The odd ones: RK2 and M4W.

I'd like to end this section with a peculiar link that was used for transmissions between Russia and Israel. The transmissions were noted between January 1996 and June 1999.

"M4W" was the Israeli side of the link and "RK2" was the Russian side. The transmissions were noted six days a week on 16129 kHz (M4W) and 16247 kHz (RK2). The Israeli station showed up at ca. 0820 UTC on 16129 kHz, Moscow started a few minutes later. Messages were rarely seen, only RY's and ops chat. The last message from the Israeli side to Russia was monitored in February 1995. The mode used by RK2 was Baudot 75Bd / 500Hz shift and M4W used Baudot 75Bd / 340Hz shift.



Ministry of Foreign Affairs
at 32 Smolenskaya-Sennaya
Square, Moscow



Lourdes SIGINT
complex. Cuba

A very popular station in the 1990's was the master station in Moscow that sent blind routine messages to KUL, VKX and several others at a fixed daily schedule. Note the "46" test slip instead of "RY". "KUL" is the callsign of the recipient, there are 3 messages with a total of 535 5-letter groups. (messages are shortened)

46
kul kul kul 3/535 kul kul kul 3/535 kul kul kul 3/535
46
kul kul kul 3/535 kul kul kul 3/535 kul kul kul 3/535
46
kul kul kul 3/535 kul kul kul 3/535 kul kul kul 3/535

11177 00142 33972 29181 01479
pofre xhtwl ewpxu garrv peife dfhfb sdstt bewph jxqzn uhlwo
lukhy mavla bgwmu vvhmo tzptw ssrx ibsho joznd grdlo nmxyf
qspsi exvhm hacfj kqzfc nylde szdqv tvwpv cnotp ozapg orijf

```
11177 00142 17790 29182 01459
uodkh mtauy ssfnc czanv caecr scyiv yccpi kqghi qvvub qursm
uozjz arrir zutzn zubfy xjzpg ozydy mxgdk cgsec cerbk jvmzc
qbazz bgssz yjjky guglv avrae yfypo avjux sxfis nihoi zsgmb
```

```
11177 00142 04039 29183 02439
enqkz kjoan ryvhn vuacc tvzuz fclci zfmsg pmjkw lgqpv aabag
wqzml mdwux ptenu dwiya xsezx zeppr fomsx poclz paftk ytmz
yydix ujdxb xqpkj flujk hbqov temvj ngfhz wynly onbmh iqdjt
```

gru gru sk sk

Another one on link 30022 with Ops chat at the end.

[illegible]

KDRUG	ALMIV	LPTAT	EACKS	YBVPF	LSCXG	AFJII	XDAHJ	RQMYX	JJXFV
HAJME	EJKMA	XXMLE	ADMSE	DSYHQ	ZVAIZ	ORANL	PEBPI	EHPGZ	LTYFU
OSBBX	DBWRM	EKOOB	NOZVX	UPPPW	ZVXHC	OAETV	DOJBR	ABOFD	TCILT

QSL 4
QRU
CFM T K S GB SK

RYRYYRYYYRYYRYYRYYYRYYRYYRYYYRYYRYYRYYYRYYRYYR
QSP QSP QSP TX QSP X ZLD ZLD
11177 30022 48526 20886 03859

MIPYE KVMGG AOCHW RDJLJ FCMOO UORGV CFKYE PVS LM YMOMY CYBUU
 ZYTNE RTPRB QMBUA GKAUP GEMLK HPCVN ZPQYS ODTWT OXUTC UFWFC
 SINUB RYXCV RDJWC VUNLX CMC MW VHUUK ZFHAJ NYZJO GBIST PXOMA

QRU QSL 4 ALL FM OM PSE DAWWAJ MEDU TXT ES PL PBL
OKOLO 15 RUSKIH REGISTROW OK ? TQVELO RABOTATX INA 4E OV??
TKS GB SK SK

Interesting are the schedules that were transmitted. Most of the times the schedules were transmitted after a regular broadcast. This one was sent by GSW.

OP TIKAS :
FM 1/9 TO 31/10
QSO 00.05 QSW 16320 / 14440
QSO 08.30 QSW 16320 / 13510
QWK QRR
FM 00.00 TO 07.00 QSW 16320 / 14440
FM 07.00 TO 09.00 QSW 16320 / 13510
FM 09.00 TO 12.00 QSW 11140 / 9320
FM 12.00 TO 22.00 QSW 9320 / 7310
FM 22.00 TO 24.00 QSW 13510 / 12130
QRU QRU SK SK

... and another one:

04.00-06.00
QRG 1 18565/16058/15683/13466/12158/11028/10328/8487/8178/7537
QRG 2 14578/11536/11134/8043/7867/7376/6888/5414/5858/5021
06.00-14.00
QRG 1 23170/22825/21860/18587/20071/18234/15683/14578/16337/12158
QRG 2 18234/18573/18617/17488/18364/13466/11028/10218/8877/7833
14.00-18.00
QRG 1 12131/15733/17488/16337/18617/16184/18308/14486/16058/11614
QRG 2 7814/10315/12188/11028/12188/11536/12131/8203/8843/5478
18.00-04.00
QRG 1 10512/10218/11068/8815/10707/8826/8487/7608/7885/5858
QRG 2 6885/6888/7376/6884/6885/6888/5836/5015/5771/4526

OK ?
WRK FM 01 11 80 KWK QUW TO NEXT QWK
ALL OK?
PSE ALL QSP TIKAS
NIL
PSE QSL
CFM
K

Typical in this sample is the 020 sequence. The string is part of the link id of the receiving station (2nd group of the preamble) as you can see in the following sample.

[illegible]

Followed by the preamble 11100 00020 00000 08054 02509 and message
27833 01104 63436 19719 53579 56352 44915 87962 06845 66774

QSL messages always had 11199 as the first group in the preamble, and began with 55555. A startling message was sent by YBU. Here is the entire message.

11199 00148 00000 20269 01759
55555 77011 99641 99749 99736 99719 99726 99667 99635 99749
99736 99710 99750 99736 99751 99762 99640 99607 99749 99736
99748 99749 99736 44326 99736 99612 99721 99736 99705 99736
99678 99736 99688 99744 99641 99744 99641 99635 99696 99696
99641 99655 44326 99736 99607 99704 99737 99688 99744 99641
99744 99750 99750 99696 99641 99768 99655 44326 99736 99704
99664 99751 99688 99744 99641 99744 99750 99750 99696 99750
99635 99655 44326 99607 99751 99698 99737 99639 99744 99750
99721 99688 99721 99641 99750 99744 99750 99641 99636 99744
99736 99711 99649 99736 99635 99696 99736 99656 99736 99635
99641 99736 99749 99750 99749 99736 99719 99756 99740 99736
99687 99736 99612 99721 99736 99705 99736 99678 99749 99677
99736 99612 99736 99649 99635 99696 99736 99683 99696 99696
99639 99696 99750 99681 99736 99656 99736 99765 99635 99639
99765 99721 99681 99655 99736 99612 99736 99649 99635 99641
99683 99750 99768 99639 99750 99636 99681 99749 99765 99749
99736 99724 99742 99736 99725 99640 99647 99751 99676 99775
99747 99601 99747 99749

Analysis shows that starting at the third group, this message uses a trinomial (3-digit) code. When sent as 5F groups, the first two digits of each 5F group are nulls. All of the code groups begin with either a 6 or a 7 except for the one group (repeated three times in the message) which uses 44 as the nulls.

Today, in 2011, at least one of the old preambles and message formats are still being used:

11100 80104 00000 12453 05009
followed by 5FGs or 5LGs.

With the introduction of new systems the formats changed. There are quite a few different formats now. I am not sure if each type is linked to a specific user (i.e. diplo, military, intelligence). Messages nowadays consist of 5LGs, 5FGs, 17FGs, 18FGs or 20FGs.

On CROWD-36 channels headers like these are quite common:

*RXJZM ITQVB JHSMXV LGET
DJNFCKGZYP AOBG RMLAWWALMR E SIU
VNWGZXYDLU VCXRMWSDABHZJ
VGPLCRI12(@7 VGPLCRI12(@7
RNCTLHPOGMV DCWOX*

Other formats on non CROWD-36 channels:

Multifigure groups e.g. 422140226144418178=

Three samples of RTTY messages sent in 2009-2011.

Marker:

00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
00000+++++++162)5761 00000+++++++162)5761
...
00000+++++++162)5761 00000+++++++162

Message on 4560 kHz, 31-10-2009, 1750 UTC

RYYRYRYRYRYRYRYRYRYRYRY

198 156 31 1750
73180 40992 98051 58069 80201 68409 58713 89297 26241 99557
76528 75368 74678 97693 74598 40849 68646 54922 70646 35357
36273 87156 95581 45166 42509 61996 76635 27585 54722 95446
64710 66507 14245 78429 10678 72612 31074 19011 20276 76609
43898 11293 42308 89005 12646 66900 69839 24801 35737 70007 =50=
51399 43734 39289 98313 83903 0198 88489 14578 45716 67715
48349 25122 04176 36264 10127 18147 34828 41296 14735 41465
67926 65006 02816 21589 27608 60975 81692 67287 93440 80624
51420 68558 39010 84931 57098 26938 27256 39833 59635 78108
67224 18759 42171 92717 61938 60730 94317 66366 02072 57464 =100=
41431 34688 85102 67915 11079 74466 64654 83704 53911 76726
59687 93853 61113 02731 78253 22283 45619 58829 35478 36496
56361 76637 17226 19848 74554 97006 83566 61417 68745 84721
31251 71859 13375 31602 92401 51900 87644 86452 50088 87071
45158 22053 67001 59857 18431 76454 85724 19760 12959 42041 =150=
67757 47207 70508 00774 63509 72251 06349 29070 30432 33983
03611 75398 31134 27498 91334 13482 28532 97745 00565 58101
86459 73935 76279 20557 68420 83615 81382 16210 30493 78543
06479 32154 -
1800 (Note the separators after 50 groups)

=80139 228621711500000113)58140 ++++++18
=8051 60964840386264588 =8612 23627091387691793
=8203 550516135165595148=8204 46710694573197773
=8195 68308720470009391 =8986 14892381603972134
=8217 83652522622347658 =8008 273716344979282115
=8169 67344825981820533 =85110 650698746459301117
=84911 756181549743948163=84312 577545925229427138
=87513 45533655694170860 =85414 555554302282781153
=76815 54917670102849578 =86016 067682077083314110

[illegible]

m4w m4w m4w ryriry
m4w m4w m4w ryriry
m4w m4w m4w ryriryryryryry
ok ok qsa 4 qsa 4
i gruu too gruu gruu
pls qso qso qso
ok ok ok tks tmxqs have a nice day
bybybyby by by by

rk2 rk2 rk2 46

rk2 rk2 rk2 46

rk2 rk2 rk2 46

hr qsa fb qsa 4
only ur wrk qrg 16128 pls next qso wrk qrg 16129 okej ?
k ok ga pls
i qru qru
int qtc
gb gb qru gb sk qso
qso will wrk
ok tks gb sk sk
sk sk

TIKAS and SEE

After the RTTY transmissions or during the broadcasts of the schedules we often saw operator's chats. The words 'TIKAS' and 'SEE' were often used, most of the times when the operators had a 'technical' chat. 'TIKAS' probably comes from Ticai or Tikat which means 'to tick' in various Slavic languages. So TIKAS probably means 'ticker' or 'telex operator / telex / telegram / telex machine' or whatever. The use of SEE in "OM AS SEE A UR PER?" indicates this translation as well (see below for KUA traffic). In this case it would be used as "OM wait, look at your tape"

vnr 05 gr 314

nr 05 gr 314

tikas

for ptf kua -after qky qrz

zkuuuuuukkkkkkaeex

tikas

for ptf kua -after qky qrz

qru sk qru sk

TIKAS in this sense, probably refers to telegram traffic on hand for 'PTF' and 'KUA'. The following was heard on the link 10163 on 16008 kHz at 0920 UTC, 24-08-1994

h qju k

ok see

ok asm

11177 10163 05870~,2.?kb660kk 004(9

cfm

64646464

vvv

om 4to ne nrawits qb ?

asm qsa bd

063 rpt

wqxkvk ok not 23 bd ?

mnqsp ?

ur op 1 ?

ok see hr all cfm pse qsp tikas pbl ili qrz op 1

ryryryryryryryryry

om pse sa qsp ?

gr ? gr ? pbl gr 1 2 3 4 5 ?

pse nryvr mni wrk vy qrl

ok asm ee see

pse qsp tikas hr all cfm

see agn

05870 pse k

asm

hw

gmagvl qsp vy pse qsp ur k

op 1 qrl ?
ok vy om 4to ne tak ?
ur new op ?
om pse qsl my qtc tak ok ?
op 1 all qsp after ili pse qrz after
ok ?
hr a wrk op 1 hr all cfm ok ?
cfm tks qsl 1 k

MODES

The governmental transmissions that we monitor are a mixture of intelligence, diplomatic and military stations. During the past 10 years a host of digital modes have been used by the Russians. In the past most of the transmissions were in AM, USB, CW and RTTY. The first CROWD-36 logs are from late 1999 and after that all the modes that are mentioned hereafter were introduced.

We still can listen to voice and morse numbers stations but the majority of the other transmissions are in heavily encrypted modern digital modes. The Enigma designator for the majority of the digital stations was M42. Enigma 2000 deleted this designator but N&O is still using it. The polytone stations however are not catalogued under M42 but under XP and the Mazielka has X06 as designator.

Mode	ENIGMA designator
AM	various E, G, S, V stations
USB	various E, G, S, V stations
CW	various M stations
MCW	various M stations
ARQ-system 100.17Bd/500Hz (ITA-5 based)	M42
ARQ-system (ITA-2/Baudot based)	M42
Baudot 50.10Bd/500Hz	M42
Baudot 50Bd/500Hz	M42
Baudot 75.12Bd/500Hz	M42
Baudot 75Bd/1000Hz	M42
Baudot 75Bd/425Hz	M42
Baudot 75Bd/500Hz	M42
Baudot 75Bd/340Hz	M42a
Baudot 100Bd/500Hz	M42
Baudot 187.5Bd/500Hz	M42
Baudot 186.7Bd/500Hz	M42
Baudot 200.32Bd/500Hz	M42
Baudot 200Bd/1000Hz (288-Bit frame)	M42
Baudot 200Bd/485Hz	M42
Baudot 200Bd/500Hz	M42
Baudot 201.68Bd	M42
Baudot 202Bd/500Hz	M42
CROWD-36	M42 (Diplo stations)
CROWD-36 + OFDM	M42 (Diplo stations)
CROWD-36/40Bd MFSK	M42 (Diplo stations)

FSK 25Bd	M42
FSK 50Bd/500Hz with 5-bit async ITA-2 coding	M42
FSK 200Bd/1000Hz	M42
Mazielka. 2-tone selcal system	X06 (Diplo stations)
Mazielka. 6-tone selcal system	X06 (Diplo stations)
MFSK 7.49Bd	M42
MFSK-20/10Bd	M42
MFSK-20/20Bd	XPA
MFSK-32	M42
MFSK-32 + 25-tone OFDM	M42
MFSK-32/CROWD36	M42
MFSK-32/CROWD36 + 25-tone OFDM	M42
MFSK 11-tone 125Bd	M42
MFSK 13 tone	M42
MFSK 15-tone 20Bd	XPA2
MFSK 16-tone 10Bd	M42
MFSK 16-tone 20Bd	M42
MFSK 32-tone	M42
MFSK 32-tone + OFDM 25-tone	M42
MFSK 32-tone/40Bd MFSK	M42
Multi tone system 1+12 (MTS 1+12)	XP
Multi tone system 12+1 (MTS 12+1)	XPH
Multi tone system 13-tone, 7.5Bd, 16Hz tone spacing	M42
Multi tone system 17+1	M42
Multi tone system 18-tone, 1.25Bd, 40Hz tone spacing (MTS 18)	XPM
OFDM 34 tones + MFSK 32 tones/40Bd	M42
PSK 2-tone	M42
QPSK	M42
VFT PSK 64Bd	M42



FSB headquarters at Bolshaya
Lubyanka, Moscow

Picture by NVO

MAZIELKA

Mazielka tone sequences.

Tone (Hz)	Number
840	1
870	2
900	3
930	4
970	5
1015	6

Variants:

2-tones

6-tones

Test sequence: 123456

1 & 2 Tones:

4

1 5

1 6

The following 6-tone sequences are frequently used. They were logged by UDXF & Spooks members in the past few years.

The list is probably not complete. Additions are appreciated.

6 Tones

561243
112111
121212
134265
153624
154632
164532
214356
215346
216354
435621
436512
463125
465132
521634
532614
534216
542136
564213
612534
615243
645321
241563
246531
256134
256341
261453
314265
352416
356412
361245
362154
412356
421635
432516

CROWD-36

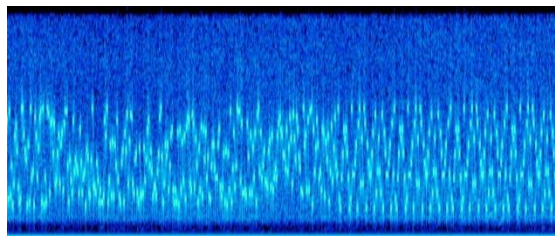
CROWD-36 is a Soviet MFSK duplex system using 36 tones based on British Piccolo MK1. It is also known as CIS/Russian Piccolo, URS multitone, CIS 10-11-11 MFSK or CIS-36.

The Russian diplo service is the main user with suspected use by CIS Intel and Military services. This system is found at 40 bd with a single tone lasting 25ms. Hand keyed traffic is usually 10 bd with a single tone lasting 100ms. A spectrum analyzer will show the tones arranged in 3 distinct groups of 10+11+11 tones. Tones are spaced 40Hz apart and tones 1, 12, 24 and 36 are rarely used so you are likely to see an 80Hz gap between groups. Each of the 32 tones represents one ITA2 character code. ITU documents have listed 4 different kinds of CROWD-36 that vary with tone duration and baud speed. The '*' entries below are commonly heard.

A few distinct patterns can be detected in a CROWD-36 signal: selcal, idling and sending traffic. Selcal and idling are a series of 5 tones repeated in the same pattern. Traffic mode is most commonly, but not always, found as 40bd encrypted and many times operator traffic can be found in the clear at 10bd. Start-up and sign-off are usually 10bd and hand keyed.

CROWD-36 transmissions are often heard within 30 minutes after Mazielka selcalls.

CROWD-36	Tone duration (ms)	Shift between tones	Tones present signal	
Variant 1	25	40	34	* 40bd
Variant 2	25	10	34	
Variant 3	100	40	34	* 10bd
Variant 4	100	10	34	



FREQUENCIES

M42 / X06 have been using a lot of frequencies during the past 10 years. This list is therefore most definitely not complete. The Mazielka calls are sometimes heard on the same frequencies as M42.

Mazielka (X06) frequencies:

4963	5072	5082	5230	5232	5270	5272	5458	5772
5780	5781	5818	5820	5831	5838	5850	5932	6496
6800	6804	6808	6842	6850	6851	6855	6868	6870
6874	6882	6883	6884	6892	6912	6912	6915	6942
6950	6958	6959	6962	6970	7490	7516	7524	7526
7527	7529	7680	7680	7682	7691	7734	7819	7820
7822	7910	7916	7939	7975	7988	8027	8063	8078
8081	8082	8083	8085	8086	8091	8105	8107	8123
8124	8131	8132	8141	8170	8175	8179	8180	8182
9053	9061	9065	9067	9072	9076	9102	9105	9106
9123	9145	9147	9168	9171	9172	9179	9197	9200
9215	9218	9235	9236	9240	9253	9288	9300	9301
9303	9305	9450	9923	9930	10116	10127	10165	10193
10196	10205	10218	10240	10270	10275	10283	10283	10335
10372	10374	10535	10536	10550	10601	10653	10712	10731
10814	10815	10816	10860	10862	10915	11022	11025	11093
11095	11114	11153	11411	11413	11424	11438	11450	11462
11464	11472	11483	11494	11525	11538	11545	11556	11565
11572	11574	11608	12066	12089	12090	12091	12100	12109
12110	12115	12117	12120	12134	12149	12150	12152	12157
12158	12167	12168	12174	12177	12177	12178	12186	12194
12195	12199	12200	12201	12207	12210	12213	12214	12215
12218	12219	12224	12225	12226	12300	12338	12500	12782
12862	12872	13000	13200	13393	13395	13401	13419	13420
13423	13425	13448	13450	13465	13467	13493	13505	13506
13517	13518	13525	13800	13842	13854	13862	13872	13925
13933	13940	13961	13985	13987	14000	14392	14419	14420
14434	14446	14475	14488	14500	14501	14547	14550	14560
14563	14570	14590	14650	14675	14720	14765	14781	14812
14815	14817	14824	14825	14845	14861	14863	14871	14942
14942	14950	14970	15289	15800	15828	15836	15858	15973
16025	16028	16045	16115	16116	16117	16119	16165	16221
16223	16225	16227	16320	16332	17420	17421	17432	17463
17511	17512	18206	18245	18250	18321	18349	18350	18920
19145	19213	19611	20347	20436	23458	kHz		

M42 frequencies

4022	4576	5081	5178	5256	5268	5324.5	5340.5	5371.5
5762.5	5772.5	5783	5937.5	6773	6780	6782.5	6788	6802
6809.5	6823.5	6832	6835	6843	6866	6872	6873.5	6878
6880.5	6891	6921	6968	7527	7560	7600.4	7629	7639
7655.5	7718	7804	7810	7886	7914	7935	7944	7952
7962	8005.5	8026.5	8030	8049.6	8050	8058.5	8066.4	8069
8074.5	8077	8079	8081	8088	8099	8108	8110	8110.5
8114	8125.5	8140.5	8157	8158	8160.5	8173	8173.5	8177
8180	8187.5	8810	8884.5	9059	9062	9073	9073	9075.5
9111	9114	9119	9119.5	9120	9121	9121.5	9124	9132
9134.5	9137	9138	9143	9145	9153	9154	9160	9180
9190	9216	9228	9230	9235	9239.5	9244	9302	9340
9354	9410.5	9412	9980	9992	10120.5	10125	10126	10141.5
10150	10163	10165	10172	10175	10175.5	10177.7	10179	10179.5
10193	10198.5	10218.5	10220	10237	10247	10270	10271	10328
10328	10393	10411	10422	10443	10467	10475	10476.7	10479
10485	10511.5	10515.5	10517.5	10546	10552	10584	10631	10648
10671	10717	10733.5	10750	10767	10815	10818	10838	10844
10853	10855	10863	11015.5	11027	11063	11069	11072	11072.5
11084.5	11099	11114	11117	11120.5	11127	11132	11140	11150

11170	11411	11412.5	11415	11415.5	11417	11421	11435	11459.5
11460	11470	11472	11478	11486	11487	11501	11523	11524.5
11525	11537	11637	11637	12118	12122	12125	12136	12137
12147	12150	12152.5	12161	12165	12170	12176	12177	12180
12184	12186.5	12187	12192	12193	12194	12196	12198	12209
12215	12215.5	12217	12219	12223.5	12239	13283	13366	13369
13380	13382	13384	13388.5	13391	13392	13410	13415	13417.5
13423	13436	13447	13451	13452	13453	13458	13462	13468
13470	13483	13484	13495	13505	13506	13521	13545	13548
13556	13579.5	13620	13621	13683	13818	13848	13852	13857
13857.5	13867	13872	13879	13880	13887.5	13888	13903	13906
13922.5	13932.5	13934.5	13957	13983.5	14270	14352	14373	14375
14381.5	14383	14389	14392	14402	14408.5	14419	14426	14427
14432	14434	14435	14440	14447	14453.5	14457	14457.5	14459
14470.5	14475	14477	14482.5	14483	14485	14505.5	14530	14535
14536	14565	14575	14576	14585	14588	14614	14626	14638
14639	14640.5	14642	14650	14650.5	14652	14655	14655.5	14657
14673.5	14690	14715	14720	14731	14787	14805	14815.5	14817
14817.5	14820	14821	14822	14823	14823.5	14827	14832	14837.5
14843	14844	14850	14866	14871	14882	14909	14914	14938
14941	14953	14968	14971.5	14973	14980	15634	15822	15824.5
15862	15872	16008	16025	16048	16064	16082	16090	16107
16119	16130	16137	16143	16144.5	16150.5	16151	16152	16153
16153.5	16158	16166.5	16178.5	16185	16212	16216	16217	16218
16219.5	16223	16227	16232	16236	16242	16248.5	16257	16275
16277.5	16285	16295	16316	16320	16323.5	16328	16342.5	16347
16347.5	16348	16350.5	16351.5	16357	16481	16842	16843	17412
17412.5	17414	17416	17417	17421	17430	17457	17463	17464
17466.5	17470.5	17473	17476.5	17477.5	17478.2	17487	17519	17528
18048	18060	18093	18111.5	18172	18173	18177	18193	18210
18210.5	18220.5	18238.5	18240	18245	18245.5	18247	18257	18274
18304	18305	18332	18373	18401	18410	18443	18506	18512
18518	18523	18538	18540	18562	18582	18588	18591	18703
18725	18752	18835	18922	19072	19088	19110	19125.5	19175
19200.5	19202	19204	19209	19354	19410	19415	19425	19518
19521.7	19522	19585	19858	19880	19923	19926	20117	20127
20138.2	20140	20157	20197	20268	20277	20322	20333.3	20370
20615	20690	20741	20815	20817	20883	20912	20940	20991
21856	22863	22865	22873	22943	22956	23130	23131 kHz.	

M42a frequencies

16129 16247 19599 kHz



FAPSI SIGINT site
near Pskov, Russia

LINK ID's AND CALLSIGNS

LINKS WITH ASSOCIATED CALLSIGNS

Link	Txm	Rcvr	Txm location	Remarks
00006				
00007				
00012				
00018				
00020		ROP		
00023				
00023				
00028				
00029			Moscow, Russia	
00030	BFR	RGA	Russian embassy, Damascus, Syria	
00030	RGA	BFR	Moscow, Russia	
00031	LKF	WCD		
00031	WCD	LKF	Moscow, Russia	
00035		PAO		
00041				
00050				
00051				
00052	NXQ	YOA	Moscow, Russia	
00052	YOA	NQX	Moscow, Russia	
00054		UDZ21	Moscow, Russia	
00063			Moscow, Russia	
00068				
00070		RAU	Moscow, Russia	
00074				
00075				
00079		UGO		
00089				
00090		GOD		
00096		FWL	Moscow, Russia	
00097			Moscow, Russia	
00098		VTX	Moscow, Russia	
00099		RSZ	Moscow, Russia	
00101		RKA		
00102		RFU		
00102		UFN		
00102	UAN	URG		
00102	URG	UAN		
00103	COY851	YFC	Cuba	

Link	Txm	Rcvr	Txm location	Remarks
00103	YFC	COY851		
00104		RPY		
00107				
00110		XQW		
00115				
00116		BPA	Cuba	
00117		HZW	Cuba	
00119		GMN	Russian embassy, Mexico City, Mexico	Location not confirmed
00125	MIG	WFO	Russian embassy, Havana, Cuba	
00125	WFO	MIG	Russian embassy, Managua, Nicaragua	
00127		JMS	Cuba	
00128		KAC	Cuba	
00132		RNO	Russian embassy Beograd, Yugoslavia	
00135		BAR	Cuba	
00139		WNY	Cuba	
00142		KUL	Moscow, Russia	
00148		YBU	Cuba	
00149	DZR	RVV		
00149	RVV	DZR	Moscow, Russia	
00155		UMK		
00162				
00166		VKX	Moscow, Russia	
00168		SPK	Cuba	
00169		KMI		
00177		RSZ		Error? RSZ's link id always was 00099. Noted once
00178		KRN		
00189				
00190		JSC		Has POU replaced JSC, or other side of the link?
00190		POU	Moscow, Russia	
00191				
00198			Moscow, Russia	
00209				
00213		RNS		
00701		UFO		
00918				
03861	PSN			
06019			Moscow, Russia	

Link	Txm	Rcvr	Txm location	Remarks
07039			Moscow, Russia	
10020				
10024				
10042	AVK	RPR	Moscow, Russia	
10042	RPR	AVK	Moscow, Russia	
10047				
10053				
10064				
10075	RYS	ZND		
10075	ZND	RYS		
10079				
10097				
10163		UDZ27	Moscow, Russia	
11063		RDT		
11230			Moscow, Russia	
12311			Moscow, Russia	
13005				
20008				
20010				
20043			Moscow, Russia	
20054			Moscow, Russia	
20065				
20076				
20087	RBP71	RVC47	Moscow, Russia	
20087	RVC47	RBP71		
20098				
20108				
30004				
30011			Moscow, Russia	
30022	KKK	KUA	Moscow, Russia	
30022	KUA	KKK	Russian embassy, Baghdad, Iraq	Location unconfirmed
30044			Moscow, Russia	
30088		RCX81	Moscow, Russia	
30132				
40007			Moscow, Russia	
40023			Moscow, Russia	
40034	RLX	UXW	Moscow, Russia	
40034	UXW	RLX	Russian embassy, London, UK	Location unconfirmed
40078				
40155				
40177				

Link	Txm	Rcvr	Txm location	Remarks
40878				
43323			Moscow, Russia	
50002		CAZ	Moscow, Russia	
50035		JUA	Moscow, Russia	
50046				
50080				
50088				
50101				
50189				
60003				
60003		FQX	Moscow, Russia	
60015			Moscow, Russia	
60047	DCW	URO		
60047	URO	DCW	Moscow, Russia	
60069		EWZ42	Moscow, Russia	
60089				
60179			Moscow, Russia	
60191				
70004		NOB	Moscow, Russia	
70026			Moscow, Russia	
70026				
70037		RAD	Moscow, Russia	
70060		DKR	Moscow, Russia	
73004				
80031				
80038		RPO	Moscow, Russia	
80050			Moscow, Russia	
80061	VNB	WQL	Moscow, Russia	
80061	WQL	VNB		
80104				
90006				
90017				
90039			Moscow, Russia	
90039				
90051	RJA	URS	Moscow, Russia	
90051	URS	RJA		
90057				
90215				
90223			Moscow, Russia	

CALLSIGNS WITHOUT LINK ID

Txm	Rcvr	Txm location	Remarks
COY851	TRO	Cuba	heard before the link id was used
DYFS	CIML		
K4MT	NT9P		
KNY31	LCU	Russian embassy, New York, USA	heard in the early 80's
M4W	RK2	Mossad, Israel	Link with SVR Moscow
NT9P	K4MT		
PLM			
RBI			
RCF		MFA Moscow, USSR	RCF is inactive. Callsign is replaced by many others
RCF45			
RHT42			
RK2	M4W	SVR Moscow, Russia	Link with Mossad
RKD		Moscow, Russia	
RKD48	RQS	Moscow, Russia	RQS is located in Samara
RKG		Moscow, Russia	
RND70	RBW		
RND79	RFT6		
ROI	RCF2		
ROK23			
ROK48			
RPD4			
RRA		Moscow, Russia	
RRL2			
RRR37			
RTW54			
RVR39			
RWA50			
RWV74			
RXZ32			
RZT76	RHM2		
SN7D			
UBW			
UGL			
UTN7	UUD4		
UUD4	UTN7		

OTHER RECEIVER'S CALLSIGNS

018	107	212	851	CMU	FRU	NDO	PTF	RSS	UXG
026	111	219	891	DMA	GLK	NMZ	RKG	RXX	WKL
037	118	242	ACD	DPL	GSW	OBX	RKM	RZJ	
047	131	513	BLA	DPU	GVS	OTD	RLJ	SCJ	
098	137	736	BLZ26	DSG	KDN	OWR	RMM	TRP	
099	162	825	BNV	EWZ40	KNA	PLM	ROL	UBW	
104	208	842	BXL	FJN	LSG	PSN	RQO	USN	



GRU Headquarters
near the Khodinka
Airfield, Moscow

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Website: <http://www.udxf.nl>

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